

CLAIMS

1. A device for the wireless transmission of electricity for the generation of at least one supply voltage for one or more electrical consumers which, if necessary, is/are arranged on a rotary device (1), characterised in that a first coil (4) connected to a supply device (15) forms the primary winding and a ring conductor (2) forms the secondary winding of a transformer, and a second coil (6) is inductively coupled to the ring conductor (2) to which coil an electrical consumer (A) is connected.
2. The device according to claim 1, characterised in that the supply device (15) comprises a supply, receiving and a transmitting unit designed as a load modulator, in that the electrical consumer (A) is designed as an electronic circuit which comprises a transmitting unit (13), a processing and control unit (11), a storage unit (12), at least one sensor element (10) and a rectifier and smoothing circuit (8), in that the rectifier and smoothing circuit (8) is connected to the second coil (6), and in that the ring conductor (2) consisting of a flexible material is arranged coaxially and the second coil (6) and the electrical consumers (A) are arranged on or in a rotary device (1) and the supply device (15) and the first coil (4) are arranged stationarily.
3. The device according to claim 2, characterised in that the rotary device (1) is a motor vehicle tyre, wherein the diameter of the ring conductor (2) is greater or smaller than the diameter of the metal belt (3) of the tyre (1), and in that the supply device (15) is arranged with the first coil (4) in the wheel housing region (31) of a motor vehicle (100).

4. The device according to claim 2 for supplying voltage to a transponder (T) arranged in or on a vehicle tyre (R), and for the data transmission between the transponder (1) and a vehicle processing unit, characterised in that
- a wheel housing unit (RE) is connected to the vehicle processing unit for each travelling wheel, which wheel housing unit comprises an interface unit (INT) connected to a bus system (LIN), a control unit (CON), a storage unit, an HF signal generator (GEN), a modulator/demodulator (AE, AS),
 - a transponder component (T) is arranged in or on each tyre, which component comprises a circuit board (PCB) with an electronic circuit (E), which incorporates a pressure and/or temperature sensor, an HF transponder circuit with receiving, transmitting and signal processing components (IC) and a rectifier and smoothing circuit (GG), a coupling coil (L) connecting the input terminals of the electronic circuit (E) and surrounding an I-core (IK), and a U-core (UK) magnetically coupled to the I-core (IK), and is surrounded by an envelope (VH) provided with an air inlet (LE) and connected to the tyre (R), and
 - each tyre (R) has a ring conductor (RL) arranged coaxially, penetrating the U-core (UK) and hence coupled inductively to it, and consisting of flexible material, the diameter of which ring conductor is greater or smaller than the diameter of the metal belt of the tyre (R).
5. The device according to claim 4, characterised in that the wheel housing unit (RE) is provided with a first

antennae (AE) acting as a receiving antenna for modulated data signals, and a second antenna (AS) acting as a transmitting antenna for an HF carrier signal, wherein the first antenna (AE) is arranged in the wheel housing so that it is located in a region of minimum field strength of the second antenna (AS), and the second antenna (AS) is connected to the wheel housing unit (RE) by means of a twisted or double cable with conductors assembled close together.

6. The device according to Claim 4 or 5, characterised in that the power supply is fed to the transponder component (T) when

- the HF carrier signal is transmitted via the transmitting antenna (AS) of the wheel housing unit (RE),
- the magnetic alternating field thus generated induces an alternating current flowing in the ring conductor (RL),
- this alternating current generates a magnetic flux in the U-core (K) crossing the ring conductor (RL) and in the connected I-core (IK), and
- the magnetic flux in the coupling coil (L) induces an alternating current voltage which is converted by means of the rectifier and smoothing circuit (GG) to at least one operating d.c. voltage (UB), and

the data transmission from the transponder component (T) to the wheel housing unit (RE) takes place when

- the HF carrier signal is transmitted via the transmitting antenna (AS) of the wheel housing unit (RE),
- the HF carrier signal is transmitted to a frequency divider parallel with the rectifier and smoothing circuit (GG), thereby generating an auxiliary carrier signal,
- the auxiliary carrier signal is modulated with low frequency data signals obtained by means of the sensor and processed by means of the signal processing unit,
- a switch is controlled by means of the modulated auxiliary carrier signal, which switch loads the transponder winding with a resistance so that side band frequency signals modulated with the data signal are generated, the frequencies of which signals have distances of whole number multiples of the frequency of the auxiliary carrier signals from the HF carrier signal,
- the signal mixture is transmitted by the transponder (T) and is received via the receiving antenna (AE) from the wheel housing unit (RE) in which the modulated auxiliary carrier signals are separated by partial suppression of the carrier signal, amplification and mixing on a non-linear characteristic,
- each signal, from the multiplicity of the modulated auxiliary signals, is filtered out and demodulated with the auxiliary carrier frequency originally obtained from the HF carrier signal by frequency division so that the data signals are

processed and transmitted via the interface (INT)
to the bus system (LIN).

7. The device according to claim 4, 5 or 6, characterised in that the tyre transponder component (T) has a signal processing unit and in that bidirectional data transmission takes place between the wheel housing unit (RE) and tyre transponder component (T).